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Phase (check one)	Type (check one)
<input checked="" type="checkbox"/> Initial Site Investigation	<input type="checkbox"/> Work Scope
<input type="checkbox"/> Corrective Action	<input checked="" type="checkbox"/> Technical Report
<input type="checkbox"/> Feasibility Investigation	<input type="checkbox"/> PCF Reimbursement Request
<input type="checkbox"/> Corrective Action Plan	<input type="checkbox"/> General Correspondence
<input type="checkbox"/> Corrective Action Summary Report	
<input type="checkbox"/> Operations & Monitoring Report	

INITIAL SITE INVESTIGATION

**Stone Hall, Vermont College
Norwich University**

**College Street
Montpelier, Vermont 05602**

**SMS Site #94-1650
UST Facility # Not Applicable
Latitude: 44° 15' 17"
Longitude: 72° 34' 08"**

Prepared for:

Vermont College, Norwich University
Bizhan Yahyazadeh, Manager of Facilities Services
College Street
Montpelier, Vermont 05602
(802) 828-8731

Prepared by:

THE JOHNSON COMPANY, INC.
100 State Street, Suite 600
Montpelier, Vermont 05602
(802) 229-4600

November 1994

THE JOHNSON COMPANY, INC.

Environmental Sciences and Engineering

November 21, 1994

Mr. Richard Spiese, Acting Supervisor
Hazardous Materials Management Division
Sites Management Section
103 South Main Street
Waterbury, Vermont 05671-0404

Re: Site Investigation Report for Stone Hall, Vermont College, Norwich University
Montpelier, Vermont
Vermont Site #94-1650

JCO #1-1442-2 (305)

Dear Richard:

Enclosed please find The Johnson Company's report of the Site Investigation of the #2 fuel oil release at Stone Hall of Vermont College, Montpelier, Vermont. If you have any questions or comments regarding this report, please do not hesitate to call.

Sincerely,

THE JOHNSON COMPANY, INC.

By: Bradley A. Wheeler
Bradley A. Wheeler, CPSS
Senior Scientist

Enclosure

cc: Bizhan Yahyazadeh, Vermont College
Michael Ricker, Norwich University

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TABLE OF CONTENTS

EXECUTIVE SUMMARY	iii
1.0 INTRODUCTION	1
2.0 SITE HISTORY	1
2.1 CONFIRMED SUBSURFACE RELEASE	4
2.2 VT SMS SITE # 94-1650	4
3.0 SITE INVESTIGATION	4
3.1 GEOLOGY AND HYDROGEOLOGY	5
3.2 GROUNDWATER SAMPLING AND ANALYSIS	5
3.3 GROUNDWATER RELATIVE ELEVATIONS	6
3.4 SOIL SCREENING	7
4.0 FINDINGS	8
4.1 SUBSURFACE PETROLEUM RELEASE	8
4.2 SURVEY OF RECEPTORS	9
4.2.1 <u>Water Supplies</u>	9
4.2.2 <u>Surface Waters and Wetlands</u>	10
4.2.3 <u>Atmospheric Receptors</u>	10
5.0 CONCLUSIONS	10
6.0 RECOMMENDATIONS	11
7.0 REFERENCES	11
8.0 LIMITATIONS	11

LIST OF FIGURES

Figure 1	Site Location Map
Figure 2	Site Sketch

LIST OF TABLES

Table 1	Summary of Laboratory Analytical Data
Table 2	Summary of PID Headspace Readings for Soils

APPENDICES

Appendix A	Background Data
Appendix B	Laboratory Analytical Reports
Appendix C	Groundwater Monitoring Well Boring and Construction Logs

EXECUTIVE SUMMARY

Stone Hall of Vermont College is located on College Street in Montpelier, Vermont. The building is connected to the Montpelier municipal water supply and sewage disposal systems.

The building was constructed circa 1967 and is currently heated by a fuel oil furnace. Fuel oil for the furnace is currently stored in a 7,500 gallon underground #2 fuel oil storage tank (UST) that is located on the southwest side of the building. This UST was installed on September 6, 1994, when a 31 year old 7,500 gallon #2 fuel oil UST was closed and removed from the Site by DuBois Construction of Montpelier, Vermont. The replacement UST is in the same location as that formerly occupied by the 31 year old UST that was removed. During the UST closure, screening of the soils was performed by The Johnson Company, Inc. using a photoionization detector (PID). The peak PID headspace reading in the soils was 133 parts per million (ppm).

The soils encountered in the excavation for the UST removal were primarily loamy sand over a silty clay loam horizon at approximately 8 to 10 feet below ground surface (bgs). Groundwater was encountered in the excavation between 8 and 9 feet bgs. Based on local topography, it appears that groundwater flows in a south/southwest direction across the Site.

On October 6, 1994 The Johnson Company performed an initial Site Investigation that included four soil borings into which groundwater monitoring wells were installed. Soil samples for PID headspace analysis were collected from each boring. A total of 12 soil samples were collected, three from each boring.

None of the samples produced PID headspace readings of greater than 2 parts per million.

Groundwater monitoring wells were installed in each of the borings (MW-1, MW-2, MW-3 and MW-4). Groundwater samples were collected from these wells on October 14, 1994. These samples were analyzed by Microassays of Vermont laboratory for petroleum related volatile organic compounds (VOCs) using EPA Method 8020 and for total petroleum hydrocarbons (TPH) using EPA Method modified 8100. Toluene was detected in well MW-4, located approximately 10 feet south of the UST excavation area. The concentration of toluene detected in the groundwater sample from MW-4 was 4 parts per billion (ppb), which is significantly below the Vermont Groundwater Protection Rule and Strategy (VGPRS) Enforcement Standard for toluene of 2,420 ppb.

*

The laboratory reported the detection of trichlorofluoromethane at 41 ppb in the groundwater sample from MW-2. The source of this contaminant is not known, but it is present at concentrations well below the Vermont Drinking Water Health Advisory of 2,000 ppb. There is no VGPRS Enforcement Standard for this compound.

Observations made during the UST removal and the chemical analysis of the water samples provide evidence that petroleum has been released to the subsurface at the Site. The likely source of this petroleum is the #2 fuel oil UST that was removed on September 6, 1994. Based on field observations, the vertical migration of this #2 fuel oil has been limited by the presence of a clayey textured soil layer that is restrictive to vertical migration of groundwater or contaminants moving in the groundwater.

It does not appear that any sensitive surface water or atmospheric receptors are impacted or threatened by the observed subsurface petroleum contamination.

It does not appear that the Site contamination is a threat to any water supply wells.

The closest potential receiving surface waters for the observed contamination at the Site is the Winooski River, located approximately 1,100 feet southwest of any measured petroleum contamination in the groundwater or soils.

A private house is located approximately 60-75 feet southwest of the former UST location. The PID headspace analysis of the soils indicated that elevated levels of volatile organic compound vapors are present only in a limited area near the tank excavation area. Based on the available data, it is unlikely that any sensitive atmospheric receptor is, or will be, measurably impacted by the observed petroleum contamination.

The groundwater quality data indicates that the surficial aquifer is not being contaminated with VOCs from the past release of #2 fuel oil above VGPRS Enforcement Standards at this time. The Johnson Company, Inc. recommends an additional round of sampling and EPA Method 8020 analysis for MW-2, MW-3 and MW-4 in April, 1995. Providing that groundwater contaminant concentrations at the Site do not exceed VGPRS Enforcement Standards, we will recommend that the Site be placed on Site Management Activity Completed status (site closure) at that time.

1.0 INTRODUCTION

This document presents the results of a Site Investigation performed by The Johnson Company at Stone Hall of Vermont College in Montpelier, Vermont (Vermont Site #94-1650). The subject Site is located on College Street, approximately 2,700 feet southeast of the intersection of Main and State Streets in Montpelier (See Figure 1, Location Map).

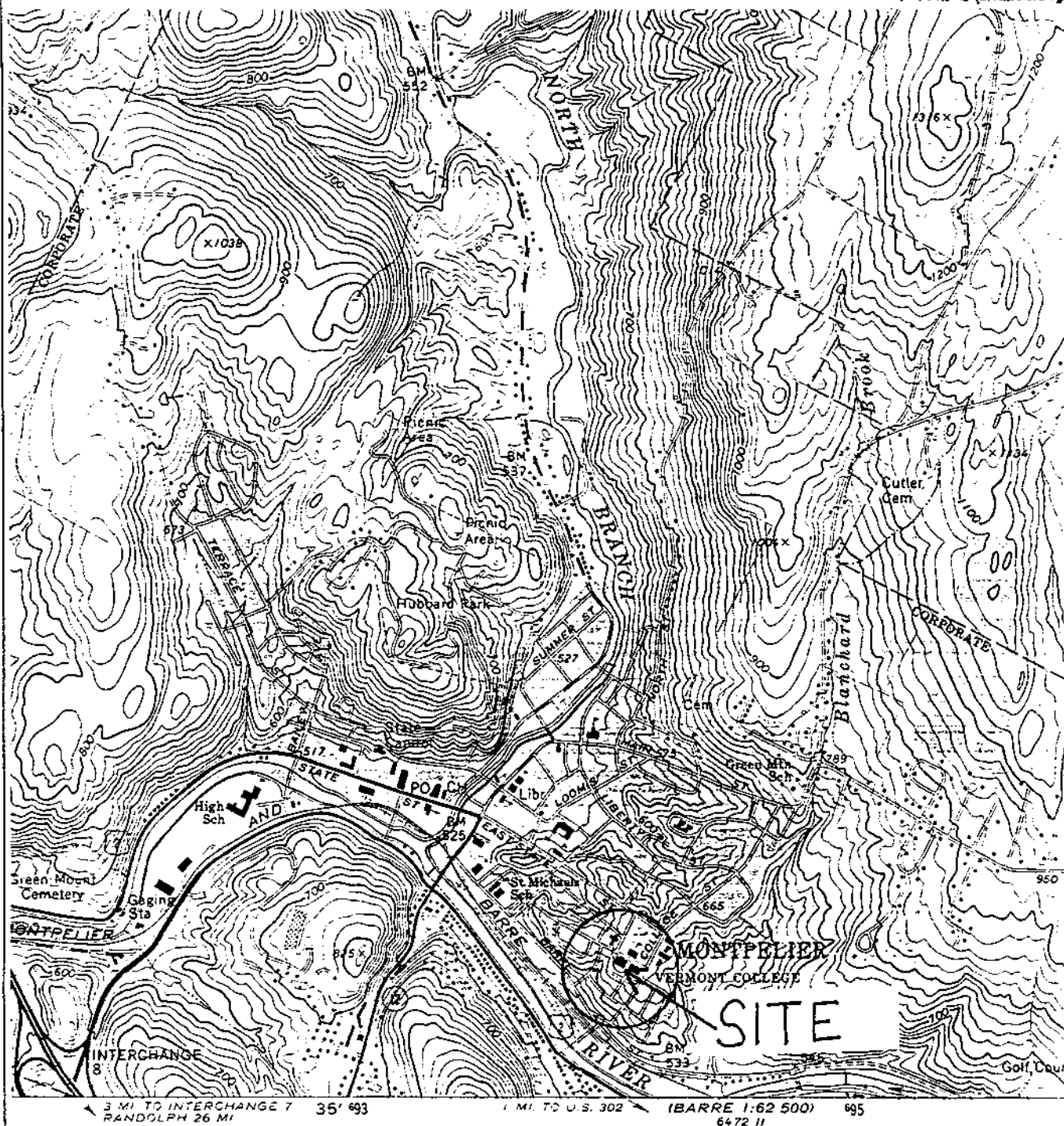
On September 7, 1994 a Site Investigation Expressway Notification was sent by mail to Marc Coleman of the Vermont Department of Environmental Conservation Underground Storage Tank Program (DEC UST Program). This report, and the work described here-in, was prepared and conducted in accordance with the May 1994 Site Investigation Guidance Document promulgated by the Vermont Hazardous Sites Management Section (SMS).

2.0 SITE HISTORY

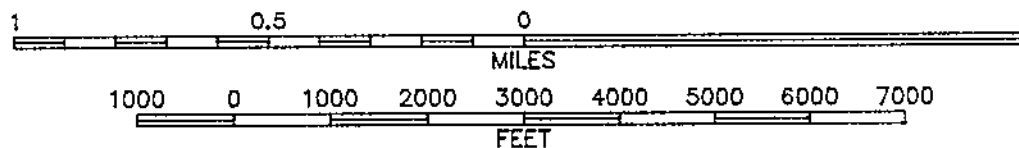
Stone Hall is located on the west side of College Street, on the Vermont College campus of Norwich University in Montpelier, Vermont. The building has been used for classrooms since it was constructed in circa 1967. For the past two years, normal classes have not taken place in the building, and it is now occupied by a variety of offices.

The building has a municipal water supply. Sewage disposal for the building is to a municipal sewage treatment system.

As part of an assessment of several of Norwich University's underground fuel oil storage tanks (USTs), on August 30, 1994 The Johnson Company advanced two hand augered soil borings beside the 31 year old UST that occupied this Site on that date. Soil headspace readings measured with a photoionization detector (PID) in a plastic bag provided evidence that a release may have occurred from the UST. The locations of these borings are shown on Figure 2 as SB-1 and SB-2. The headspace readings obtained were: SB-1; 118 inches below the ground surface (bgs), 3.1 parts per million (ppm); SB-2; 130-136 inches bgs, 1.4 ppm; 140-144 inches bgs, 0.0 ppm. Petroleum-like odors were evident in the soils that provided positive headspace readings, but were not evident at other depths in these borings. Additionally, the samples that provided the positive readings were from soils of fine sand textures, while the deeper sample from SB-2 was silty clay loam, apparently illustrating the effect of a layer restrictive to the vertical migration of the contamination.



NORTH



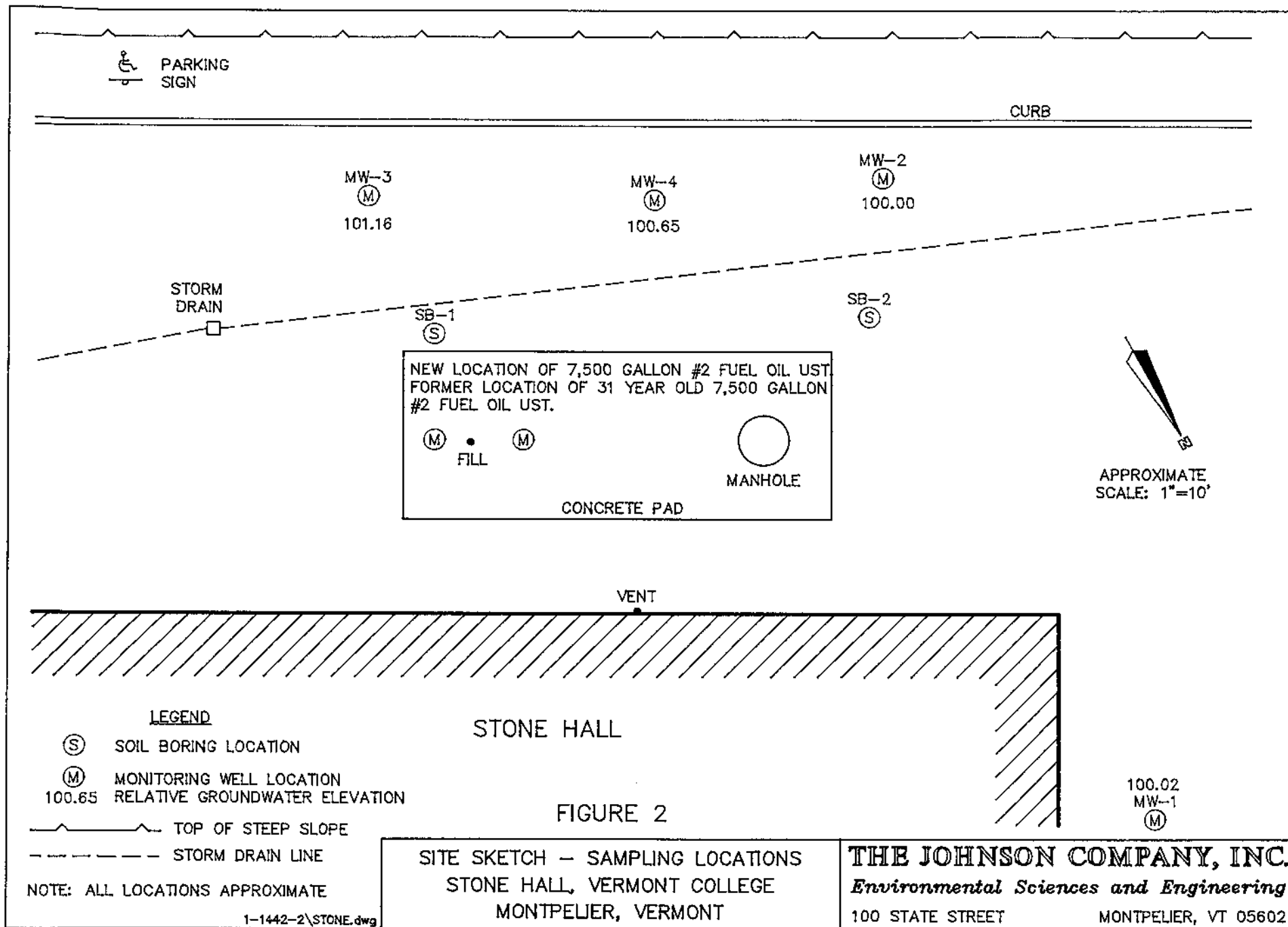
CONTOUR INTERVAL 20 FEET



BASE MAP: USGS 7.5 Minute Topographic Quadrangle MONTPELIER, VT 1968

FIGURE 1 : Site Location Map
Stone Hall, Vermont College
Montpelier, Vermont

THE JOHNSON COMPANY, INC.
Environmental Sciences and Engineering
100 STATE STREET MONTPELIER, VT 05602



2.1 CONFIRMED SUBSURFACE RELEASE

On September 6, 1994 the 31 year old 7,500 gallon #2 fuel oil UST was excavated and removed from the Site by DuBois Construction of Montpelier, Vermont. The Johnson Company conducted the soil and groundwater assessment for the UST removal. During the UST closure, screening of the soils was performed using a PID. The peak PID headspace reading in the soils was 133 ppm. Due to the apparent quantity of contaminated soils and the lack of a suitable stockpile storage area, the contaminated soils were replaced in the excavation (See Appendix A for copies of the tank removal forms and report).

2.2 VT SMS SITE # 94-1650

On the basis of the September 6, 1994 tank removal report submitted to the DEC UST Program, the Site was listed as an Active Hazardous Waste Site and assigned Active Hazardous Waste Site Number 94-1650 by the SMS. A Site Investigation was performed by The Johnson Company during October 1994. This report describes the Site Investigation, provides the investigation results and offers the recommendations of The Johnson Company regarding future assessment of this Site.

3.0 SITE INVESTIGATION

The soil and groundwater investigation for this Site was performed by Bradley A. Wheeler, CPSS, Senior Scientist for The Johnson Company. Adams Engineering of Underhill, Vermont was the drilling subcontractor for this investigation. The tasks performed for this investigation included the collection of soils samples from four soils borings, the installation of four groundwater monitoring wells, vapor monitoring via PID headspace analysis of 12 soil samples, measurements of groundwater depth and relative elevation surveying of the monitoring well tops of casings to calculate the groundwater flow direction, the collection of groundwater samples for laboratory analysis, and an assessment of the relative potential risk to sensitive receptors. Laboratory analysis of the groundwater samples was performed by Microassays of Vermont laboratory. The laboratory analytical reports are included in Appendix B. The locations of the monitoring wells are shown on the Site Sketch (Figure 2). Groundwater Monitoring Well Boring and Construction Logs are included in Appendix C.

3.1 GEOLOGY AND HYDROGEOLOGY

The ground surface elevation at the Site is approximately 660 feet above sea level based on the 1968 United States Geological Survey (USGS) topographic map of the Montpelier, Vermont quadrangle.

Based on the Soil Survey of Washington County, Vermont, the soils at the Site are deep (>5 feet to bedrock) well drained, silty glacial till. Mapping units that include shallow soils and exposed bedrock outcrops are shown north, east, south and west of the Site, within approximately 1,500 feet of the Site. It is not expected that bedrock is very deep below the soil surface at this Site. An estimated range would be 25 to 50 feet below the surface. The depths to bedrock for the 106 private water supply wells in Montpelier is highly variable, but typically is less than 50 feet, and frequently less than 20 feet.

The upper approximately eight to ten feet of surficial materials are composed of loamy fill and fine sand deposits, as observed in the soil borings and the UST excavation pit. A restrictive layer of silty clay loam is present on the Site starting approximately eight to ten feet below the soil surface. The thickness of this restrictive layer is not known, as it was not penetrated during this investigation. However, it was seen to be over 7 feet thick at MW-3 and 6.5 feet thick at MW-2.

3.2 GROUNDWATER SAMPLING AND ANALYSIS

Groundwater samples were collected from the four monitoring wells on October 14, 1994. During the purging of the wells, the groundwater recharge into each well was very slow and consequently each well was bailed dry. The groundwater samples were collected after the wells had recharged sufficiently to provide a sample. The wells had been developed using small diameter tubing and a low flow peristaltic pump, so they were not pumped dry during this procedure.

Immediately upon collection, the samples were placed on ice in a cooler and were hand delivered under chain of custody to Microassays Laboratory of Vermont in Middlesex, Vermont on the same day.

With the exception of toluene at 4 parts per billion (ppb) in MW-4, no petroleum related volatile organic compounds (VOCs) were detected in these samples when analyzed by EPA Method 8020 (See Table 1 below, and Appendix B). The laboratory verbally reported the detection of trichlorofluoromethane at 41 ppb in MW-2. This compound is not reportable under the 8020 method, but the laboratory actually runs a more comprehensive method (gas chromatograph with mass spectrometer confirmation) that was able to detect the trichlorofluoromethane.

No groundwater enforcement standards were exceeded as indicated by the concentrations of contaminants reported in the groundwater samples.

TABLE 1 SUMMARY OF LABORATORY ANALYTICAL DATA EPA Method 8020 by GC/MS (VOCs) and Modified 8100 (TPH) (all units are parts per billion)						
COMPOUND	MW-1	MW-2	MW-3	MW-4	QC ¹	ENFORCEMENT STANDARD ²
Benzene	BPQL ³	BPQL	BPQL	BPQL	BPQL	5
Toluene	BPQL	BPQL	BPQL	4	BPQL	2,420
Ethylbenzene	BPQL	BPQL	BPQL	BPQL	BPQL	680
Xylenes	BPQL	BPQL	BPQL	BPQL	BPQL	400
TPH ⁴	BPQL	BPQL	BPQL	BPQL	N/A	N/A

- 1 The QC sample was an equipment blank prepared at the site, using one of the bailers used for monitoring well sampling.
- 2 The enforcement standard is from the Vermont Groundwater Protection Rule and Strategy, except for MTBE, which is the Vermont Drinking Water Health Advisory.
- 3 BPQL means Below the Practical Quantitation Limit.
- 4 TPH means Total Petroleum Hydrocarbons.

As Table 1 shows, the concentration of toluene reported in the sample from MW-4 (4 ppb) is well below the VGPRS Enforcement Standard (2,420 ppb).

Since the VOC analysis was conducted with a GC/MS method, essentially an EPA Method 8260, it was able to detect another compound in the groundwater sample from MW-2 that is not normally reportable under the 8020 analysis. The compound that was detected is trichlorofluoromethane, or Freon 11. It was detected at 41 parts per billion (ppb).

3.3 GROUNDWATER RELATIVE ELEVATIONS

On October 14, 1994, the relative elevations of the tops of casings for the four groundwater monitoring wells was recorded using an auto-level. In conjunction with this, the depth to groundwater from the well top of casing was measured in each well. This provided us with the data necessary to determine the groundwater flow direction for the Site.

Based on the data collected for groundwater flow direction calculations, it appears that stormwater runoff that is collected into a nearby storm drain system may be leaking from the catch basin slightly east of the UST and/or along the storm drain piping, causing the groundwater to appear to be flowing in a northwesterly direction, parallel to the upper edge of the steep hill that slopes down to the south/southwest of the Site. Based on the obvious local relief, it is expected that the groundwater in this area would be flowing south/southwest (or downhill). The groundwater relative elevations are shown below each monitoring well on Figure 2, but the data was not used to generate a groundwater contour map due to its anomalous nature.

The piping for the storm drain is approximately 4 feet bgs in this area, so it is not acting as a preferential pathway for groundwater flow, since the groundwater is approximately 6 to 9 feet bgs.

3.4 SOIL SCREENING

The four soil borings conducted during this investigation were advanced using a vibratory drill rig equipped with a five foot-long, polyethylene-lined soil sampler. Soil samples were obtained from the sampler for screening in the field with a calibrated PID. The soil samples were placed into re-closeable plastic bags, mixed for approximately one minute, and allowed to equilibrate for at least 15 minutes. The samples were then mixed again for approximately one minute, and the headspace in the bag was then assayed using the PID, and the highest sustained reading was recorded. The soil horizons were logged from the soil samples. Detailed descriptions of the soils and the PID readings obtained are included on the Groundwater Monitoring Well Boring and Construction Logs in Appendix C.

Table 2, below, summarizes the PID headspace readings performed on October 6, 1994. A Thermo Environmental Model 580B Organic Vapor Meter (OVM) PID was used to measure VOC vapors. Background atmospheric VOC concentrations were below 1 ppm. The PID was calibrated using 100 ppm isobutylene calibration gas.

TABLE 2 SUMMARY OF PID HEADSPACE READINGS FOR SOILS		
SAMPLE LOCATION ID	SAMPLE DEPTH (feet below ground surface)	PID HEADSPACE READING (ppm)
MW-1	5-5.5	1.0
	10-10.5	1.2
	13-13.5	0.9
MW-2	4.5-5.5	0.2
	10-10.5	0.3
	14.5-15	1.2
MW-3	5-5.5	0.4
	10-10.5	1.2
	15-15.6	1.1
MW-4	0.5-0.8	1.7
	5-5.5	1.0
	10-10.5	0.4

4.0 FINDINGS

4.1 SUBSURFACE PETROLEUM RELEASE

A total of four soil borings were advanced in order to determine the degree and extent of contamination resulting from the release of #2 fuel oil from the UST that was removed from the Site on September 6, 1994. Groundwater monitoring wells were installed into each of the borings. The locations of the monitoring wells are shown on Figure 2, Site Sketch - Sampling Locations.

Field screening with a PID of soil samples from these borings indicated that petroleum is not present in significant concentrations in the soils around the UST removal excavation. The closest boring (MW-4) is located approximately 10 feet south (the presumed hydrologically downgradient direction) of the tank removal excavation area. PID headspace readings observed in the soils collected from this boring, as well as for all the other samples, were below 2 ppm.

Laboratory analysis of the groundwater samples collected from the groundwater monitoring wells detected only a very low concentration of toluene in one of the wells, MW-4. Toluene was reported in this sample at a concentration of 4 ppb. Toluene is a common component of petroleum products, and it is likely that the toluene reported in the groundwater sample from MW-4 is a result of the release of #2 fuel oil from the 31 year old UST that was removed from the Site on September 6, 1994. As stated above, MW-4 is the well closest to the former location of that UST, and is in what is presumed to be the most direct hydrologically downgradient position. The Vermont Groundwater Protection Rule and Strategy Enforcement Standard for toluene is 2,420 ppb. The EPA Maximum Contaminant Level for toluene in drinking water is 1,000 ppb.

In addition to the petroleum release, trichlorofluoromethane was reported detected in the groundwater sample from MW-2. This compound is not regulated under the Vermont Groundwater Protection Rule and Strategy, and it has been delisted as a hazardous waste in the State of Vermont. It has a Vermont Drinking Water Health Advisory of 2,000 ppb. The Chief of the SMS has reported to us in the past that Freon is not actively managed at sites when it is found in low concentrations (in that instance, the reference was to another species of Freon, dichlorodifluoromethane, found at concentrations of 1,250 and 1,840 ppb). To further this comparison, the Vermont Drinking Water Health Advisory for dichlorodifluoromethane is 1,000 ppb, or 1/2 that of trichlorofluoromethane.

4.2 SURVEY OF RECEPTORS

No sensitive receptor was identified that is in immediate risk from contamination on this Site. Based upon sampling, and observation, it is evident that the petroleum contamination has not migrated beyond the property line in the subsurface in concentrations above VGPRS Enforcement Standards. On the basis of these investigations, the observed petroleum contamination currently presents little, if any, risk to any potential receptor.

4.2.1 Water Supplies

Two water supplies currently in use were identified within 1,000 feet of the observed petroleum contaminated soils. These wells provide processing water for the Desilets Granite Company at the corner of Barre and Granite Streets and for the Montpelier Granite Works at 8 Granite Street. They are not used as sources of drinking water, according to Durwood Lamb of the Montpelier Public Works office. The Desilets Granite Company property is approximately 800 feet southwest of the Site. The Montpelier Granite Works property is approximately 1,000 feet southwest of the Site. Groundwater flow direction across the Site is southwest, based on the ground surface topography.

The groundwater samples at the Site indicate that petroleum contamination is not migrating beyond the property line at concentrations above the VGPRS Enforcement Standards. The wells at Desilets Granite and Montpelier Granite Works described above appear to be downgradient of the Site and potentially could be receptors of petroleum contamination in the groundwater. However, based on the limited extent and low concentration of observed groundwater contamination, it is highly unlikely that any water supply well is, or will be, impacted by the petroleum contamination documented at this Site.

4.2.2 Surface Waters and Wetlands

The closest potential receiving waters for the observed contamination at the Site is the Winooski River. The river is over 1,200 feet from any measured petroleum contamination at the Site. No other sensitive environments were identified within 1,000 feet of the Site.

Because of the limited extent of the observed contamination, there are no potential surface water or wetlands receptors of the observed soil and groundwater contamination.

4.2.3 Atmospheric Receptors

No elevated levels of VOCs were detected in the atmosphere on the Site except during the UST excavation. Due to the very low levels of contamination documented at the perimeter of the Site, the Carl Thuren house at 6-8 Summit Street that is southwest of the Site is not at risk of impact by petroleum related vapors.

5.0 CONCLUSIONS

The documented subsurface release from the 31 year old underground #2 fuel oil storage tank (now closed and removed) has not caused significant soil contamination beyond the immediate area excavated for the UST removal. Groundwater contamination has been documented at this Site. However, the observed concentrations of toluene (4 ppb) and trichlorofluoromethane (41 ppb) do not exceed the Vermont Groundwater Protection Rule and Strategy Enforcement Standards, Vermont Drinking Water Health Advisories or EPA Maximum Contaminant Levels for Drinking Water.

No sensitive or atmospheric receptors were identified which are or will be measurably impacted by the observed petroleum contamination. Two water supply wells (process water only) approximately 800 and 1,000 feet from the Site were identified as potential receptors of groundwater contamination. However, based on the observed very low concentrations of contaminants in the groundwater on the Site, it is unlikely that these wells will be measurably impacted by the petroleum contamination.

6.0 RECOMMENDATIONS

The Johnson Company, Inc. recommends that groundwater in the three downgradient monitoring wells on the Site (MW-2, MW-3 and MW-4) be sampled and analyzed by EPA Method 8020 again in April, 1995. If, at that time, there have been no exceedences of enforcement standards, then we will recommend that the Site be placed on Site Management Activity Completed status (site closure).

Observed groundwater contamination at this Site is not above enforcement standards or Vermont Health Risk Advisory levels. Sampling and analysis of nearby water supply wells is not warranted unless enforcement standards for groundwater contaminants are exceeded.

7.0 REFERENCES

The Johnson Company, 1994a, Telephone Conversation between Brad Wheeler and Durwood Lamb, Montpelier Public Works, October 19, 1994.

The Johnson Company, 1994b, Telephone Conversation between Brad Wheeler and Greg Bostock, Vermont Agency of Natural Resources Water Supply Division, October 19, 1994.

The Johnson Company, 1994c, Telephone Conversation between Brad Wheeler and Jim Ashley, Vermont Agency of Natural Resources Water Supply Division, October 26, 1994.

The Johnson Company, 1994d, Telephone Conversation between Brad Wheeler and Brendan McMahon, Laboratory Director, Microassays of Vermont Laboratory, October 25, 1994.

The Johnson Company, Inc. 1994e, Wheeler, Brad, September 7, 1994, Site Investigation Expressway Notification Form.

USDA-Soil Conservation Service, June 1989, Interim Soil Survey Report of Washington County, Vermont.

8.0 LIMITATIONS

The conclusions presented here are arrived at through consideration of the findings of this investigation as presented herein. Consideration was given to the information gathered during the Site Investigation, the field screening results of environmental samples, and through interpretation of laboratory analytical data. A diligent effort was made to identify areas of concern that may have been

indicated from the conditions described above.

This Site Investigation was based on sound scientific investigative techniques and experience with similar investigations. However, the conclusions of this investigation are limited by the sources of data, as stated above, and the conclusions and recommendations must be considered within this context. The status of the Site may change, and additional information may become available in the future which will require modification or updating of the conclusions and recommendations presented here. If conditions are found to vary from those presented here, supplemental conclusions and recommendations may be warranted.

Reviewed by: J-B

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Appendix A
Background Data

THE JOHNSON COMPANY, INC.

Environmental Sciences and Engineering

September 7, 1994

Mr. Marc Coleman
Vermont Department of Environmental Conservation
Underground Storage Tank Program
103 South Main Street
Waterbury, Vermont 05671-0404

Re: UST Removal at Stone Hall, Vermont College Campus of Norwich University, Montpelier, Vermont
JCO # 1-1442-1 (305)

Dear Marc:

On September 6, a 7,500 gallon underground #2 fuel oil storage tank (UST) was removed from the south side of Stone Hall, Vermont College, Montpelier Vermont. The Vermont Department of Environmental Conservation Underground Storage Tank (DEC UST) Program Tank Pull Forms for this UST removal are attached. The age of this UST was 31 years. A 6,000 gallon replacement UST was installed in the excavation for this UST removal. The location of this UST is along the south side of the Vermont College campus, with a residential street immediately to the south. A home is approximately 50-75 feet south of the UST location.

Lee's Oil Service was hired to pump and clean the UST. DuBois Construction excavated the UST and removed it from the ground. The Johnson Company was present on behalf of Norwich University to complete the site assessment for the UST removal.

As the UST was being excavated, the soils that were removed from beside the tank were continuously screened with a Model 580B Thermo Environmental Instruments OVM (PID). The PID was calibrated on the morning of the site work, using 101 ppm isobutylene gas. The observed fill materials consist of loamy sand. The excavated soil was determined to be contaminated at levels typically in the range of 15 to 30 parts per million (ppm). Soil from some areas showed readings as high as 120 to 133 ppm. After the UST was removed from the excavation, soils from under the UST were examined. The underlying soils consist of loamy sand, with a layer of silty clay loam at approximately 10 feet bgs. The sandy soils under the UST were contaminated at levels between 37 and 133 ppm. The silty clay loam soils provided readings of approximately 2 ppm, indicating that this layer is restrictive to the vertical migration of the contamination. Groundwater was encountered in the excavation at approximately 8.5 feet bgs. Based on the local topography, it appears that groundwater flow direction is to the south/southwest. No sheens, free product or hazardous concentrations of vapors were evident on the groundwater or in the excavation. Bedrock was not encountered in the excavation, and is not evident in the immediate vicinity.

The condition of the UST appeared to be relatively good, with no visible holes. Some rusting and pitting of the bottom and sides of the tank were noted. Based on the UST condition and the nature of the soil contamination around the UST, it appears that much of the release of fuel oil at this site is attributable to leaking associated with the piping system close to the UST itself. The bed of the piping to the building did not appear to be contaminated.

Mr. Marc Coleman
Vermont Department of Environmental Conservation
Waterbury, Vermont

September 7, 1994
Page 2

Based on conversations with the VT DEC UST Program office, Norwich University officials and with you on the site, it was determined that the most appropriate immediate action would be to return the excavated soils to the hole created by the UST removal and consider a later investigation to better characterize the extent of the soil and groundwater contamination in this area. The apparent extent of the soil contamination at the site and the lack of a suitable area for stockpiling contaminated soils made the option of stockpiling soils infeasible.

We plan to proceed with the investigation of this site under the DEC's new Site Investigation Expressway. The work plan for this investigation will follow the Department's Guidance Document printed in May 1994. We are anticipating that the costs of investigating this site will be reimbursable under the Petroleum Cleanup Fund (PCF). We request that the SMS please confirm in writing our assumption that the site is covered under the PCF as soon as possible.

Please call if you have any questions regarding this site.

Sincerely,

THE JOHNSON COMPANY, INC.

By: 
Bradley A. Wheeler, CPSS
Senior Scientist

cc: Bizhan Yahyazadeh, Manager of Facilities Services, Vermont College

Reviewed by: ARL
I:\PROJECTS\1-1442-1\STONEPUL RPT September 6, 1994 16:47 BAW



State of Vermont

Department of Fish and Wildlife
 Department of Forests, Parks and Recreation
 Department of Environmental Conservation
 State Geologist
 Natural Resources Conservation Council
 RELAY SERVICE FOR THE HEARING IMPAIRED
 1-800-253-0191 TDD>Voice
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AGENCY OF NATURAL RESOURCES
 Department of Environmental Conservation
 Hazardous Materials Management Division
 103 South Main Street/West Office
 Waterbury, Vermont 05671-0404
 (802) 241-3888
 FAX (802) 244-5141

SITE INVESTIGATION EXPRESSWAY NOTIFICATION

Site Owner: Norwich University

Site Name, Town: Stone Hall, VT College, Montpelier

☒ Yes, this site will participate in the Site Investigation Expressway Process.

☐ No, this site will not participate in the Site Investigation Expressway Process.

If yes, please complete the checklist below:

✓ Contamination present in soils above action levels ☒ Yes ☐ No

If yes, summarize levels:

UST removal; #2 fuel oil; OVM PID readings up to 133 ppm

✓ Free product observed ☐ Yes ☒ No

✓ Groundwater contamination observed ☒ Yes ☐ No *Not confirmed, but groundwater was present at levels where soil was heavily contaminated.*

✓ Surface water contamination observed ☐ Yes ☒ No

✓ Suspected release of hazardous substances ☒ Yes ☐ No

If yes, please explain:

#2 fuel oil, most likely from piping above UST

✓ Affected receptors ☐ Yes ☒ No *Undetermined, one house is 50-75' downgradient, should be screened w/ PID*

If yes, please identify receptors including names and addresses of third party receptors:

Please provide an estimated date of when you expect to submit Site Investigation Report: Nov. 20, 1994

VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION
UNDERGROUND STORAGE TANK PROGRAM
103 SOUTH MAIN STREET
WATERBURY, VERMONT 05671-0404
(802) 244-8702

Date of Removal: 9/6/94 Date of Assessment: 9/6/94
Person & Company Doing Assessment: Brad Wheeler, The Johnson Co.
Telephone Number: 229-4600

Business Name Where Tank(s) Located: Norwich University - VT. College - Stone Hall
Number of Employees: _____
Street Address & Town/City: College Street, Montpelier, VT
Owner of Tank(s): Norwich University / VT College
Address: College St
Town/City: Northfield, VT Montpelier, VT
Contact Person: Bizhan Yahyazadeh
Phone Number: 828-8731
UST Facility ID Number: _____

Tank #	Product	Size	Condition
1	<u>#2 fuel oil</u>	<u>7,500 gal.</u>	<u>good - no holes were evident,</u>
2			<u>some rust & pitting</u>
3			
4			

Reason for Tank Removal (check one): ☐ abandoned ☒ routine replacement
☐ tank or piping leaking ☐ liability

Replacement Tank(s)? ☒ yes ☐ no Number of Replacement Tanks: 1

DEC UST Permit(s) Obtained? ☐ yes ☒ no

DEC-Permitted Tank(s) Still On-Site? ☐ yes ☒ no Number of Tanks: _____

Out of Service Tank(s) On-Site? ☐ yes ☒ no Number of Tanks: _____

Heating Oil Tank(s) On-Site? ☒ yes ☐ no No. of Tanks: 1 Size(s): 6,000

Any Waste Pumpage? ☒ yes ☐ no Estimated Volume: _____
Transported By: Lees Oil Service

Size of Excavation (ft²): 300 ft² Depth: 10' Soil Type: sandy fill
Concentrations Detected with PID: Peak = 133 ppm Average = 20 ppm
Type of PID: Thermo Environmental 580 B OVM continuous PID screen
Number of Readings (please put locations on attached drawing): plus 12 headspace samples
Calibration Info. (date, time, type of gas): 9/6/94; 7:15; 100 ppm isobutylene

Free Phase Product Encountered? ☐ yes ☒ no Approx. Amount: _____

Cont. Soils Stockpiled? ☐ yes ☒ no Amount (yd³): _____

Cont. Soils Backfilled? ☒ yes ☐ no Amount (yd³): 30-40 yd³

Groundwater Encountered? ☒ yes ☐ no Depth to Groundwater: 8.5'

Monitoring Wells Installed? ☐ yes ☒ no Number: _____ Screen Depth: _____

On-Site Drinking Well? ☐ yes ☒ no (if yes: ☐ rock ☐ gravel ☐ spring)

Public Water Supply Well(s) Within 1/4 Mile? ☐ yes ☒ no
Distance to nearest: _____

Private Water Supply Well(s) Within 1/4 Mile? ☐ yes ☒ no How Many? _____

Samples Collected for Laboratory Analysis? ☐ yes ☒ no How Many? _____
[check all that apply: ☐ soil ☐ groundwater ☐ drinking water]

Receptors Affected (check all that apply):
☒ soil ☐ residential; # of houses/people: _____
☒ groundwater ☐ surface water; name/type of water body: _____

Signature of Owner or Authorized Representative: Brad Wheeler

Date: 9/6/94

Signature of Person Performing Site Assessment: Bradley A. Wheeler

Date: 9/6/94

VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION
UNDERGROUND STORAGE TANK PROGRAM
TANK PULL FORM

TODAY'S DATE: 9/6/94

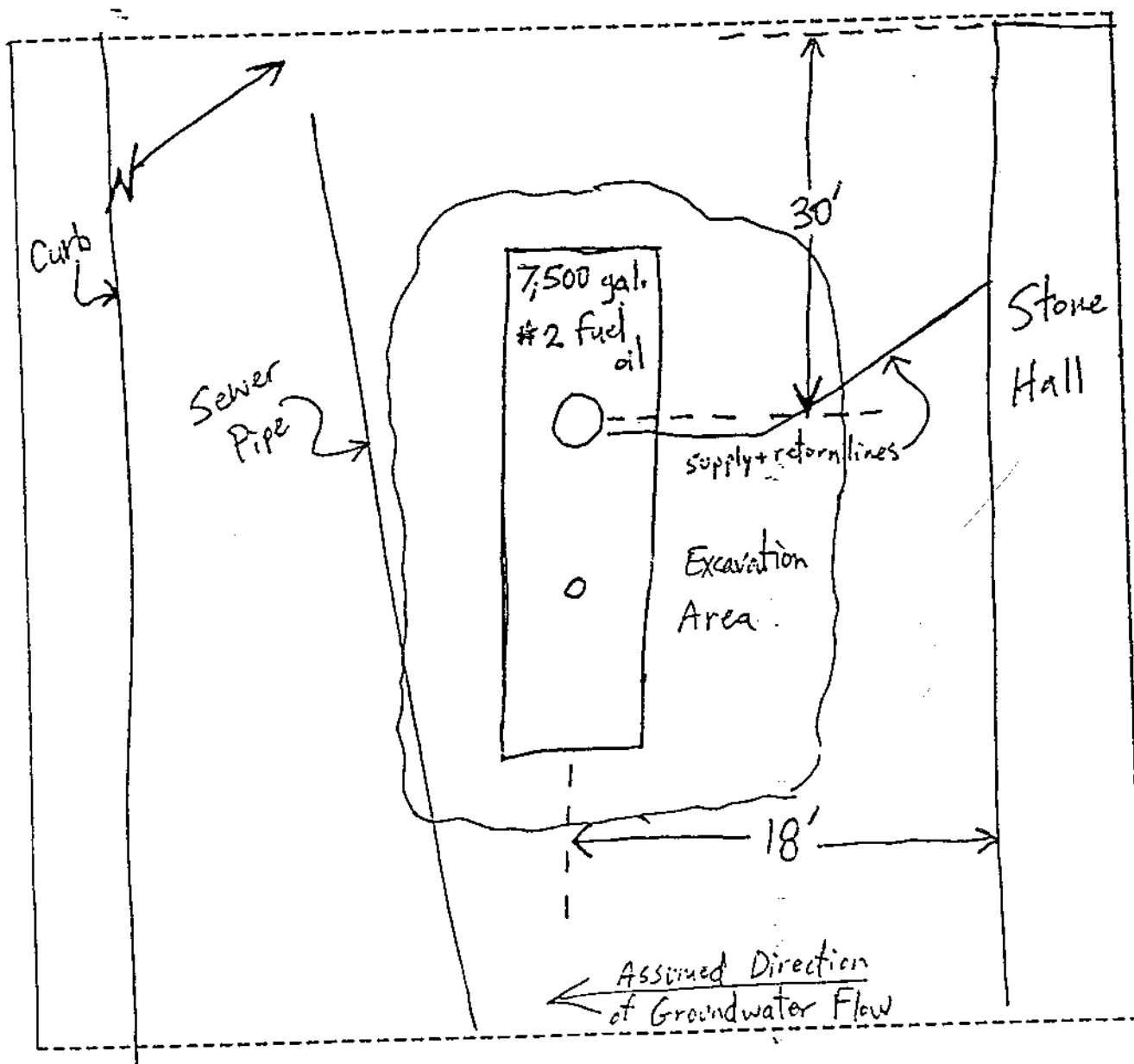
INSPECTOR: Bradley A. Wheeler
The Johnson Company

DATE OF REMOVAL: 9/6/94

BUSINESS NAME: Norwich University

SITE DIAGRAM

Show location of all tanks and distance to permanent structures, sample points, areas of contamination and any pertinent site information. Indicate North arrow and major street names or route number.



Appendix B

Laboratory Analytical Reports



1-1442-2
BAW

LABORATORY ANALYSIS

CLIENT NAME:	The Johnson Company, Inc.	REF #:	10007
ADDRESS:	100 State Street Montpelier, VT 05602	PROJECT NO.:	1-1442-2
SAMPLE LOCATION:	Norwich Univ./ Stone Hall - VT College	DATE OF SAMPLE:	10/14/94
SAMPLER:	Bradley A. Wheeler	DATE OF RECEIPT:	10/14/94
		DATE OF ANALYSIS:	10/24, 10/25/94
ATTENTION:	Bradley A. Wheeler	DATE OF REPORT:	10/25/94

Pertaining to the analyses of specimens submitted under the accompanying chain of custody form, please note the following:

- Water samples submitted for VOC analysis were preserved with HCl.
- Specimens were processed and examined according to the procedures outlined in the specified method.
- Holding times were honored.
- Instruments were appropriately tuned and calibrations were checked with the frequencies required in the specified method.
- Blank contamination was not observed at levels interfering with the analytical results.
- Continuing calibration standards were monitored at intervals indicated in the specified method. The resulting analytical precision and accuracy were determined to be within method QA/QC acceptance limits.
- The efficiency of analyte recovery for individual samples was monitored by the addition of surrogate analytes to all samples, standards, and blanks. Surrogate recoveries were found to be within laboratory QA/QC acceptance limits, unless noted otherwise.

Reviewed by:

Brendan McMahon, Ph.D.



LABORATORY REPORT

EPA METHOD 8020 ANALYTES + MTBE with GC/MS Confirmation

CLIENT NAME:	The Johnson Company, Inc.	PROJECT CODE:	1-1442-2
PROJECT NAME:	Norwich Univ./ Stone Hall - VT College	MAV REF.#:	10,007
REPORT DATE:	October 25, 1994	STATION:	MW-1
DATE SAMPLED:	October 14, 1994	TIME SAMPLED:	11:35
DATE RECEIVED:	October 14, 1994	SAMPLER:	Bradley A. Wheeler
ANALYSIS DATE:	October 25, 1994	SAMPLE TYPE:	Water

PARAMETER	PQL (µg/L)	Conc. (µg/L)
Benzene	1	BPQL
Toluene	1	BPQL
Ethylbenzene	1	BPQL
m+p-Xylene	2	BPQL
o-Xylene	1	BPQL
Chlorobenzene	1	BPQL
1,2-Dichlorobenzene	1	BPQL
1,3-Dichlorobenzene	1	BPQL
1,4-Dichlorobenzene	1	BPQL
MTBE	1	BPQL

Surrogate % Recovery: 96%

BPQL = Below Practical Quantitation Limit (PQL).



LABORATORY REPORT

EPA METHOD 8020 ANALYTES + MTBE with GC/MS Confirmation

CLIENT NAME:	The Johnson Company, Inc.	PROJECT CODE:	1-1442-2
PROJECT NAME:	Norwich Univ./ Stone Hall - VT College	MAV REF.#:	10,007
REPORT DATE:	October 25, 1994	STATION:	MW-2
DATE SAMPLED:	October 14, 1994	TIME SAMPLED:	11:45
DATE RECEIVED:	October 14, 1994	SAMPLER:	Bradley A. Wheeler
ANALYSIS DATE:	October 25, 1994	SAMPLE TYPE:	Water

PARAMETER	PQL (µg/L)	Conc. (µg/L)
Benzene	1	BPQL
Toluene	1	BPQL
Ethylbenzene	1	BPQL
m+p-Xylene	2	BPQL
o-Xylene	1	BPQL
Chlorobenzene	1	BPQL
1,2-Dichlorobenzene	1	BPQL
1,3-Dichlorobenzene	1	BPQL
1,4-Dichlorobenzene	1	BPQL
MTBE	1	BPQL

Surrogate % Recovery: 98%

BPQL = Below Practical Quantitation Limit (PQL).

MicroAssays of Vermont, Inc. P.O. Box 189 Middlesex, Vermont 05602 (802) 223-1468 FAX 223-8688



LABORATORY REPORT

EPA METHOD 8020 ANALYTES + MTBE with GC/MS Confirmation

CLIENT NAME:	The Johnson Company, Inc.	PROJECT CODE:	1-1442-2
PROJECT NAME:	Norwich Univ./ Stone Hall - VT College	MAV REF.#:	10,007
REPORT DATE:	October 25, 1994	STATION:	MW-3
DATE SAMPLED:	October 14, 1994	TIME SAMPLED:	12:20
DATE RECEIVED:	October 14, 1994	SAMPLER:	Bradley A. Wheeler
ANALYSIS DATE:	October 25, 1994	SAMPLE TYPE:	Water

PARAMETER	PQL (µg/L)	Conc. (µg/L)
Benzene	1	BPQL
Toluene	1	BPQL
Ethylbenzene	1	BPQL
m+p-Xylene	2	BPQL
o-Xylene	1	BPQL
Chlorobenzene	1	BPQL
1,2-Dichlorobenzene	1	BPQL
1,3-Dichlorobenzene	1	BPQL
1,4-Dichlorobenzene	1	BPQL
MTBE	1	BPQL

Surrogate % Recovery: 97%

BPQL = Below Practical Quantitation Limit (PQL).

MicroAssays of Vermont, Inc. P.O. Box 189 Middlesex, Vermont 05602 (802) 223-1468 FAX 223-8688



LABORATORY REPORT

EPA METHOD 8020 ANALYTES + MTBE with GC/MS Confirmation

CLIENT NAME:	The Johnson Company, Inc.	PROJECT CODE:	1-1442-2
PROJECT NAME:	Norwich Univ./ Stone Hall - VT College	MAV REF.#:	10,007
REPORT DATE:	October 25, 1994	STATION:	MW-4
DATE SAMPLED:	October 14, 1994	TIME SAMPLED:	12:35
DATE RECEIVED:	October 14, 1994	SAMPLER:	Bradley A. Wheeler
ANALYSIS DATE:	October 25, 1994	SAMPLE TYPE:	Water

PARAMETER	PQL (µg/L)	Conc. (µg/L)
Benzene	1	BPQL
Toluene	1	4
Ethylbenzene	1	BPQL
m+p-Xylene	2	BPQL
o-Xylene	1	BPQL
Chlorobenzene	1	BPQL
1,2-Dichlorobenzene	1	BPQL
1,3-Dichlorobenzene	1	BPQL
1,4-Dichlorobenzene	1	BPQL
MTBE	1	BPQL

Surrogate % Recovery: 96%

BPQL = Below Practical Quantitation Limit (PQL).



LABORATORY REPORT

EPA METHOD 8020 ANALYTES + MTBE with GC/MS Confirmation

CLIENT NAME:	The Johnson Company, Inc.	PROJECT CODE:	1-1442-2
PROJECT NAME:	Norwich Univ./ Stone Hall - VT College	MAV REF.#:	10,007
REPORT DATE:	October 25, 1994	STATION:	Equipment Blank
DATE SAMPLED:	October 14, 1994	TIME SAMPLED:	11:10
DATE RECEIVED:	October 14, 1994	SAMPLER:	Bradley A. Wheeler
ANALYSIS DATE:	October 24, 1994	SAMPLE TYPE:	Water

PARAMETER	PQL (µg/L)	Conc. (µg/L)
Benzene	1	BPQL
Toluene	1	BPQL
Ethylbenzene	1	BPQL
m+p-Xylene	2	BPQL
o-Xylene	1	BPQL
Chlorobenzene	1	BPQL
1,2-Dichlorobenzene	1	BPQL
1,3-Dichlorobenzene	1	BPQL
1,4-Dichlorobenzene	1	BPQL
MTBE	1	BPQL

Surrogate % Recovery: 99%

BPQL = Below Practical Quantitation Limit (PQL).

MicroAssays of Vermont, Inc. P.O. Box 189 Middlesex, Vermont 05602 (802) 223-1468 FAX 223-8688



1-1442-
BAW

LABORATORY ANALYSIS

CLIENT NAME:	The Johnson Company, Inc.	REF #:	10007
ADDRESS:	100 State Street Montpelier, VT 05602	PROJECT NO.:	1-1442-2
SAMPLE LOCATION:	Norwich Univ./Stone Hall	DATE OF SAMPLE:	10/14/94
SAMPLER:	Bradley A. Wheeler	DATE OF RECEIPT:	10/14/94
		DATE OF ANALYSIS:	11/10/94
ATTENTION:	Bradley A. Wheeler	DATE OF REPORT:	11/15/94

TOTAL PETROLEUM HYDROCARBONS
by Capillary GC/MS
(modified semivolatile method 8100)

Sample	PQL	TPH in mg/Kg
MW-1	2	BPQL
MW-2	2	BPQL
MW-3	2	BPQL
MW-4	2	BPQL
Equipment Blank	2	BPQL

BPQL = Below Practical Quantitation Limit

Reviewed by:

Brendan McMahon, Ph.D.
Director, Chemical Services

THE JOHNSON CO., INC.
MONTPELIER, VERMONT

NOV 21 1994

RECEIVED

CHAIN OF CUSTODY RECORD

CHAIN OF CUSTODY RECORD									
Client/Project Name Norwich Univ. / Stone Hall				Project Location VT College				ANALYSES	
Project No. 1-1442-2				Field Logbook No.				10007	
Sampler: (Signature) <i>Bradley A. Wheeler</i>				Chain of Custody Tape No.					
Sample No./ Identification	Date	Time	Lab Sample Number	Type of Sample	8020	TPH-mod. 8100	FORTHCOMING	REMARKS	
MW-1 st col	10/14/94	11:35	✓	H ₂ O	X	X		2) 40 ml. vials	
MW-2 nd col		11:45	✓	↓	X	X			
MW-3 rd col		12:20	✓		X	X			
MW-4 th col		12:35	✓		X	X		(2) 40 ml. vials	
Equip Blank OK	✓	11:10	✓						
Relinquished by: (Signature) <i>Bradley A. Wheeler</i>				Date 10/14/94	Time 13:45	Received by: (Signature) <i>Sara Holst</i>		Date 10/14/94	Time 1:50
Relinquished by: (Signature)				Date	Time	Received by: (Signature)		Date	Time
Relinquished by: (Signature)				Date	Time	Received for Laboratory: (Signature)		Date	Time
Sample Disposal Method:				Disposed of by: (Signature)				Date	Time
SAMPLE COLLECTOR				ANALYTICAL LABORATORY - Microassays of Vermont					
5 State Street Montpelier, VT 05602 (802) 229-4600 Fax: (802) 229-5876				THE JOHNSON COMPANY, INC. Environmental Sciences and Engineering					
				Note: Invoice to: Bizhan Yahyazadeh, Mgr. of Facilities Services VT College College Street Montpelier, VT 05602					

Appendix C

Groundwater Monitoring Well Boring and Construction Logs

The Johnson Company, Inc.
Environmental Sciences and Engineering
100 State Street
Montpelier, Vermont 05602

DRILLING LOG /
WELL # MW-1

Project: Norwich University
Location: Stone Hall, VT College
Job # 1-1442-2
Logged By: BAW
Date Drilled: 10/06/94
Driller: Adams Engineering
Drill Method: Vibratory Corer

Casing Type: PVC
Casing Diameter: 2.0 in.
Casing Length: 2.7 ft.
Screen Type: factory slotted
Screen Diameter: 2.0 in.
Screen Length: 10.0 ft.
Slot Size: 0.01"

Total Pipe: 12.7 ft.
Stick Up: -0.3 ft.
Total Hole Depth: 13.0 ft.
Well Guard Length: 1.0 ft.
Initial Water Level: 10.0 ft.
Surface Elevation: -
T.O.C. Elevation: -

■ = Sampled Interval

Sheet 1 of 1

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5					
4					
3					
2					
1					
0		Well Guard			
		Cement			
1		Bentonite			
2		Backfill			
3				1.0 ppm	0-3.5 feet, brown fine sand; 3.5-5.5 feet, grayish brown silt loam, moist
4					
5					
6		Sand Pack			brown very fine sandy loam, wet
7					
8		Screen		1.2 ppm	
9					
10					
11		Silty Clay			gray silty clay loam, wet-saturated, hole collapsed at 6.5 feet, so corer was full at 13.8 feet and could not advance further
12				0.9 ppm	
13					
14					
15					
16					
17					

The Johnson Company, Inc.
Environmental Sciences and Engineering
100 State Street
Montpelier, Vermont 05602

DRILLING LOG
WELL # MW-2

Project: Norwich University
Location: Stone Hall, VT College
Job # 1-1442-2
Logged By: BAW
Date Drilled: 10/06/94
Driller: Adams Engineering
Drill Method: Vibratory Corer

Casing Type: PVC
Casing Diameter: 2.0 in.
Casing Length: 4.7 ft.
Screen Type: factory slotted
Screen Diameter: 2.0 in.
Screen Length: 10.0 ft.
Slot Size: 0.01"

Total Pipe: 14.7 ft.
Stick Up: -0.3 ft.
Total Hole Depth: 15.0 ft.
Well Guard Length: 1.0 ft.
Initial Water Level: 7.7 ft.
Surface Elevation: -
T.O.C. Elevation: -

■ = Sampled Interval

Sheet 1 of 1

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5					
4					
3					
2					
1					
0		Well Guard			light brown fine sand, dry
		Cement			
1		Bentonite			
2					
3				0.2	
4		Sand Pack			
5					
6					5.5-8.5, light brown fine sand;
7					8.5-10.5, light gray silty clay
8				0.3	loam, wet
9					
10					
11		Silty Clay			brownish gray silt loam, wet-
12		Screen		1.2	saturated
13					
14					
15					
16					
17					

The Johnson Company, Inc.
Environmental Sciences and Engineering
100 State Street
Montpelier, Vermont 05602

DRILLING LOG WELL # MW-3

Project: Norwich University
Location: Stone Hall, VT College
Job # 1-1442-2
Logged By: BAW
Date Drilled: 10/06/94
Driller: Adams Engineering
Drill Method: Vibratory Corer

Casing Type: PVC
Casing Diameter: 2.0 in.
Casing Length: 2.7 ft.
Screen Type: factory slotted
Screen Diameter: 2.0 in.
Screen Length: 10.0 ft.
Slot Size: 0.01"

Total Pipe: 12.7 ft.
Stick Up: -0.3 ft.
Total Hole Depth: 13.0 ft.
Well Guard Length: 1.0 ft.
Initial Water Level: 8.0 ft.
Surface Elevation: -
T.O.C. Elevation: -

■ = Sampled Interval

Sheet 1 of 1

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5					
4					
3					
2					
1					
0					
1	Well Guard				
1	Cement				
2	Bentonite				
3				0.4 ppm	0-3 feet, brown fine sand; 3-5.5 feet, light gray silt loam
4					
5	Sand Pack				
6					
7					
8				1.2 ppm	5.5-8.5 feet, brown very fine sandy loam, wet 8.5-10.5 feet, gray silty clay loam, saturated
9	Screen				
10	Silty Clay				
11					
12				1.1 ppm	10.5-12 feet, brown loamy very fine sand, saturated 12-13.5 feet, light gray silty clay loam, saturated 13.5-15.6 feet, gray silty clay, saturated
13					
14					
15					
16					
17					

The Johnson Company, Inc.
Environmental Sciences and Engineering
100 State Street
Montpelier, Vermont 05602

DRILLING LOG WELL # MW-4

Project: Norwich University
Location: Stone Hall, VT College
Job # 1-1442-2
Logged By: BAW
Date Drilled: 10/06/94
Driller: Adams Engineering
Drill Method: Vibratory Corer

Casing Type: PVC
Casing Diameter: 2.0 in.
Casing Length: 2.2 ft.
Screen Type: factory slotted
Screen Diameter: 2.0 in.
Screen Length: 7.0 ft.
Slot Size: 0.01"

Total Pipe: 9.2 ft.
Stick Up: -0.3 ft.
Total Hole Depth: 9.5 ft.
Well Guard Length: 1.0 ft.
Initial Water Level: 7.0 ft.
Surface Elevation: -
T.O.C. Elevation: -

■ = Sampled Interval

Sheet 1 of 1

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5					
4					
3					
2					
1					
0		Well Guard		1.7 ppm	brown fine sand
		Cement			
1		Bentonite			olive brown fine sandy loam
2					
3		Sand Pack		1.0 ppm	
4					
5					
6		Silt			5.5-7.5 feet, brown loamy very fine sand, wet
7		Screen		0.4 ppm	7.5-9.5 feet, gray silt loam, saturated
8					9.5-10.5 feet, gray silty clay, saturated
9					
10					
11					
12					
13					
14					
15					
16					
17					

CEMENT	ASPHALT	VERY FINE SAND	SILTY CLAY	GRAVELLY SAND
BACKFILL	GROUT	FINE SAND	SANDY SILT	GRAVEL
BENTONITE	TOPSOIL	MEDIUM SAND	SANDY TILL	CLAY
SAND PACK	DOLEMITE	COARSE SAND	SILTY TILL	TILL
GRAVEL PACK	BEDROCK	SILTY SAND	CLAYEY SAND	SILT

KEY TO GEOLOGY PATTERNS
STONE HALL, VERMONT COLLEGE
MONTPELIER, VERMONT

THE JOHNSON COMPANY, INC.
Environmental Sciences and Engineering
100 STATE STREET MONTPELIER, VT 05602